# FIG. 1



GROUND ASSISTED

10

12 DRIVER

32

34

N1

N2

R1

36

N3

N5

N6

A — 14

B — 16

C — 18

42
(Reverse surface)

D — 20

40
(Obverse surface)
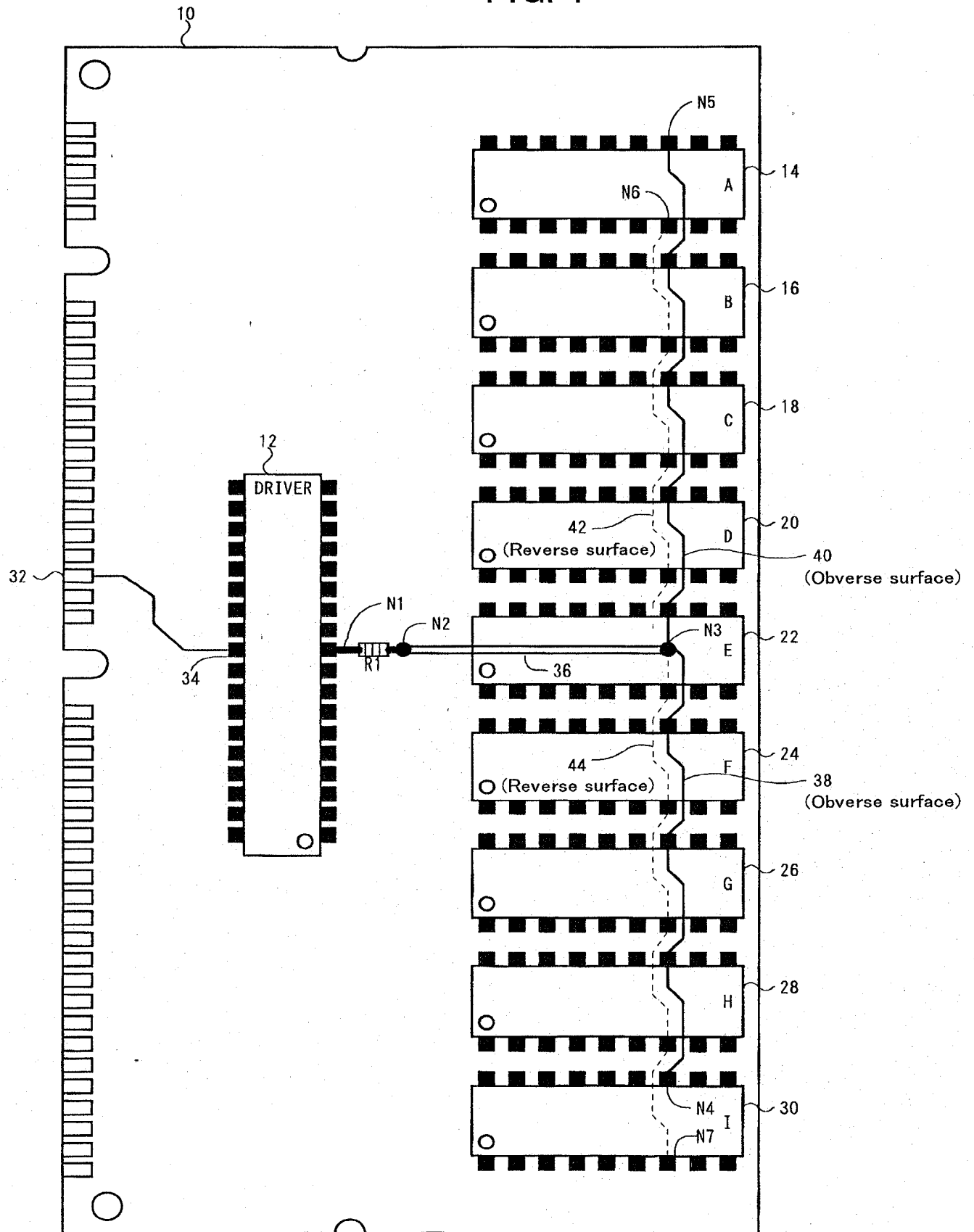
E — 22

44
(Reverse surface)

F — 24

38
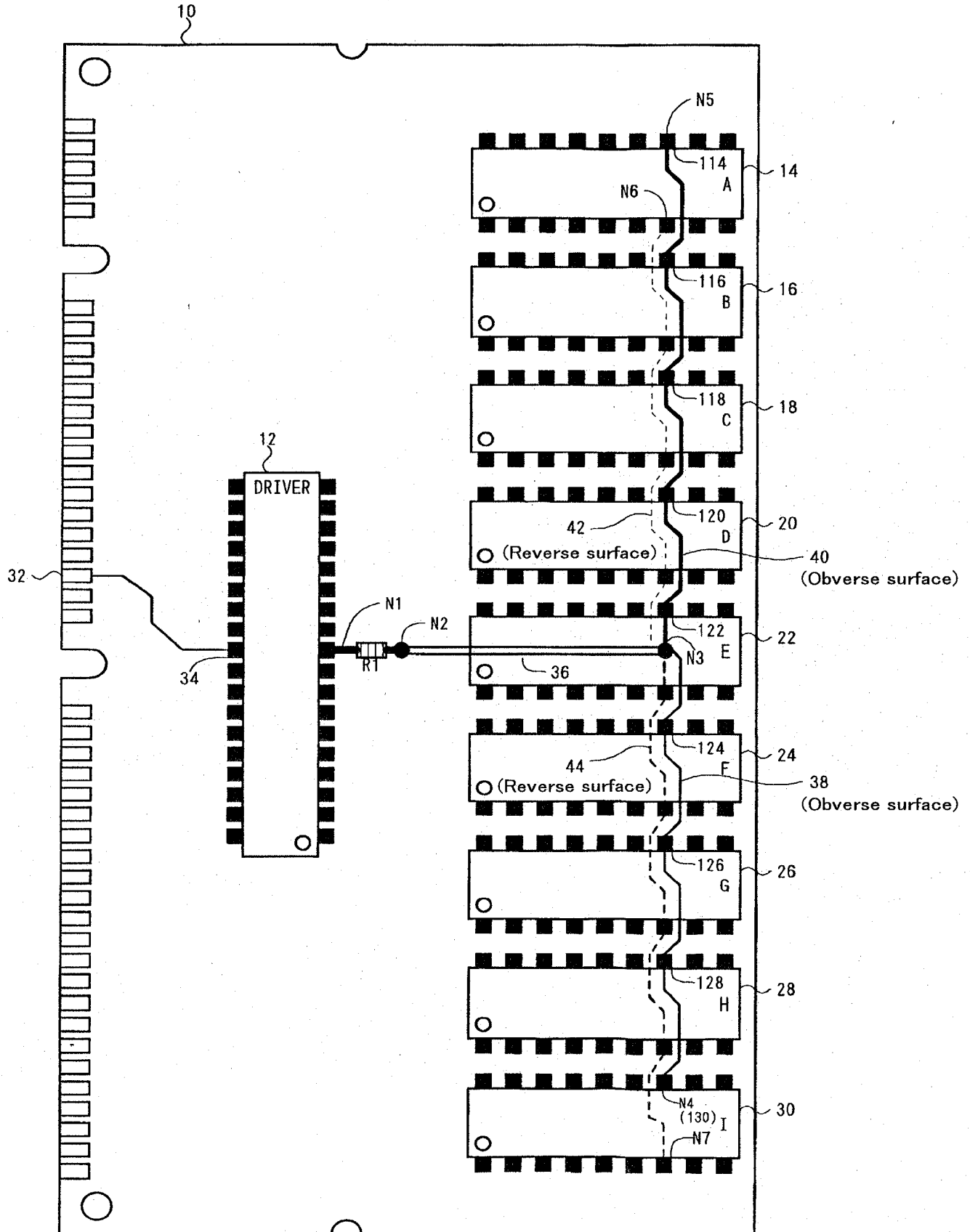(Obverse surface)

G — 26

H — 28

N4

N7

I — 30

## FIG. 2

FIG. 3

# FIG. 4
## FIRST EMBODIMENT



10

N5
114
A — 14

N6
116
B — 16

118
C — 18

DRIVER
12

42
(Reverse surface)
120
D — 20

40
(Obverse surface)

N1
N2
R1
N3
122
E — 22

32

34
36

124
F — 24

44
(Reverse surface)

38
(Obverse surface)

126
G — 26

128
H — 28

N4
(130) I
N7
— 30

# FIG. 5
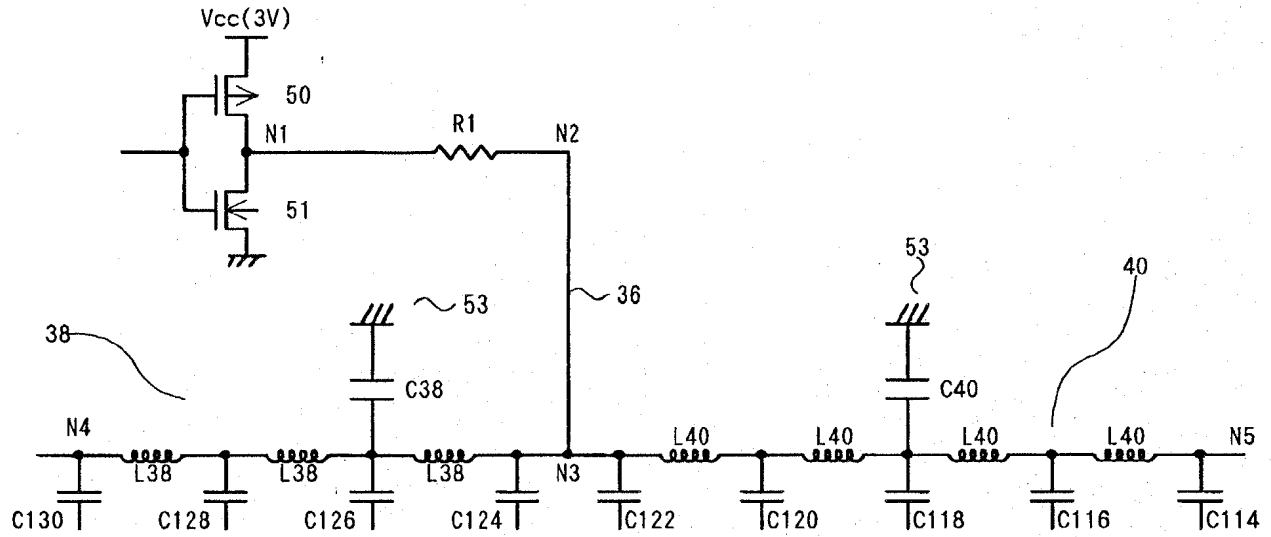


$$Td = \sqrt{Lo(Co+Cd)} \qquad Zo = \sqrt{\frac{Lo}{Co+Cd}}$$

Co=C38 or C40
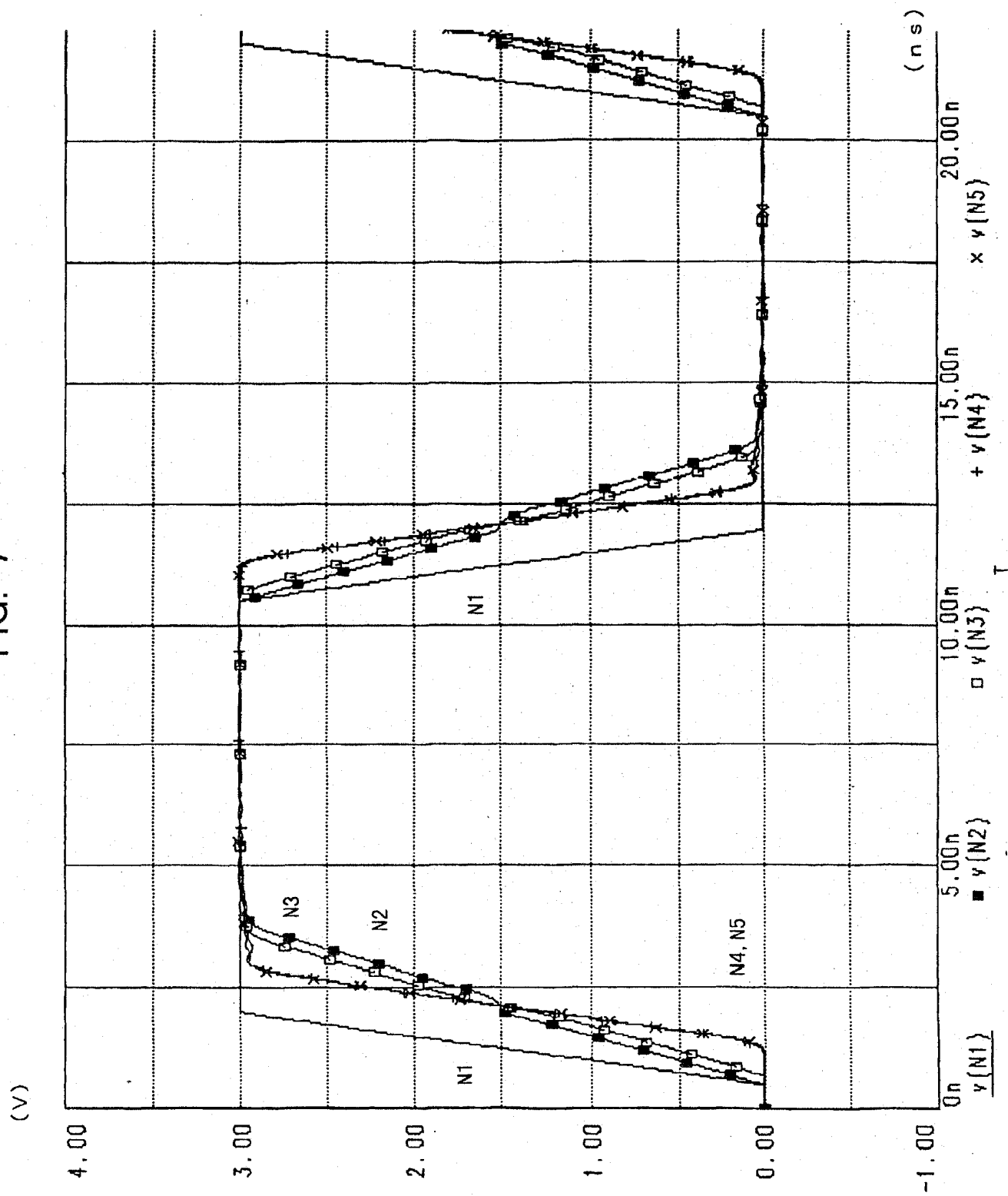Cd=C124+C126+C128+C130
or
=C114+C116+C118+C120+C122

# FIG. 6

## SIGNAL TRANSMISSION PERIOD TO WIDTHS
## FOR BRANCHED SIGNAL LINES

| Width of branched signal line | Cd PF/m | Co PF/m | Lo nH/m | Zo Ω | Td ns/m | Tdl ns/m |
|---|---|---|---|---|---|---|
| 0.05mm | 250 | 71 | 520 | 85.6 | 6.08 | 12.92 |
| 0.10mm | 250 | 82 | 450 | 74.1 | 6.07 | 12.22 |
| 0.20mm | 250 | 109 | 356 | 57.1 | 6.23 | 11.31 |
| 0.40mm | 250 | 159 | 263 | 40.7 | 6.47 | 10.37 |
| 0.80mm | 250 | 252 | 173 | 26.2 | 6.60 | 9.32 |
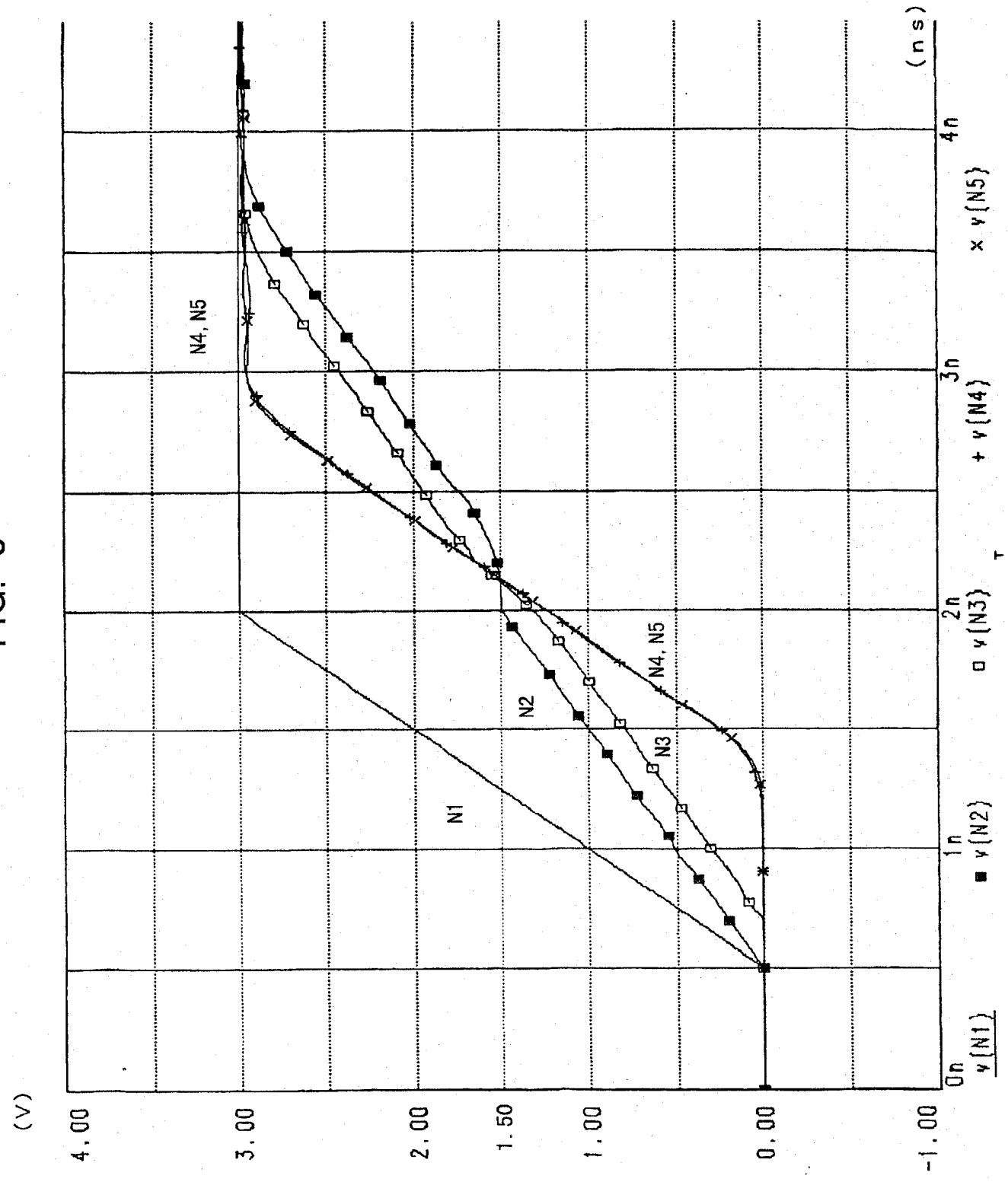
# FIG. 7

FIG. 8

# FIG. 9

## SECOND EMBODIMENT
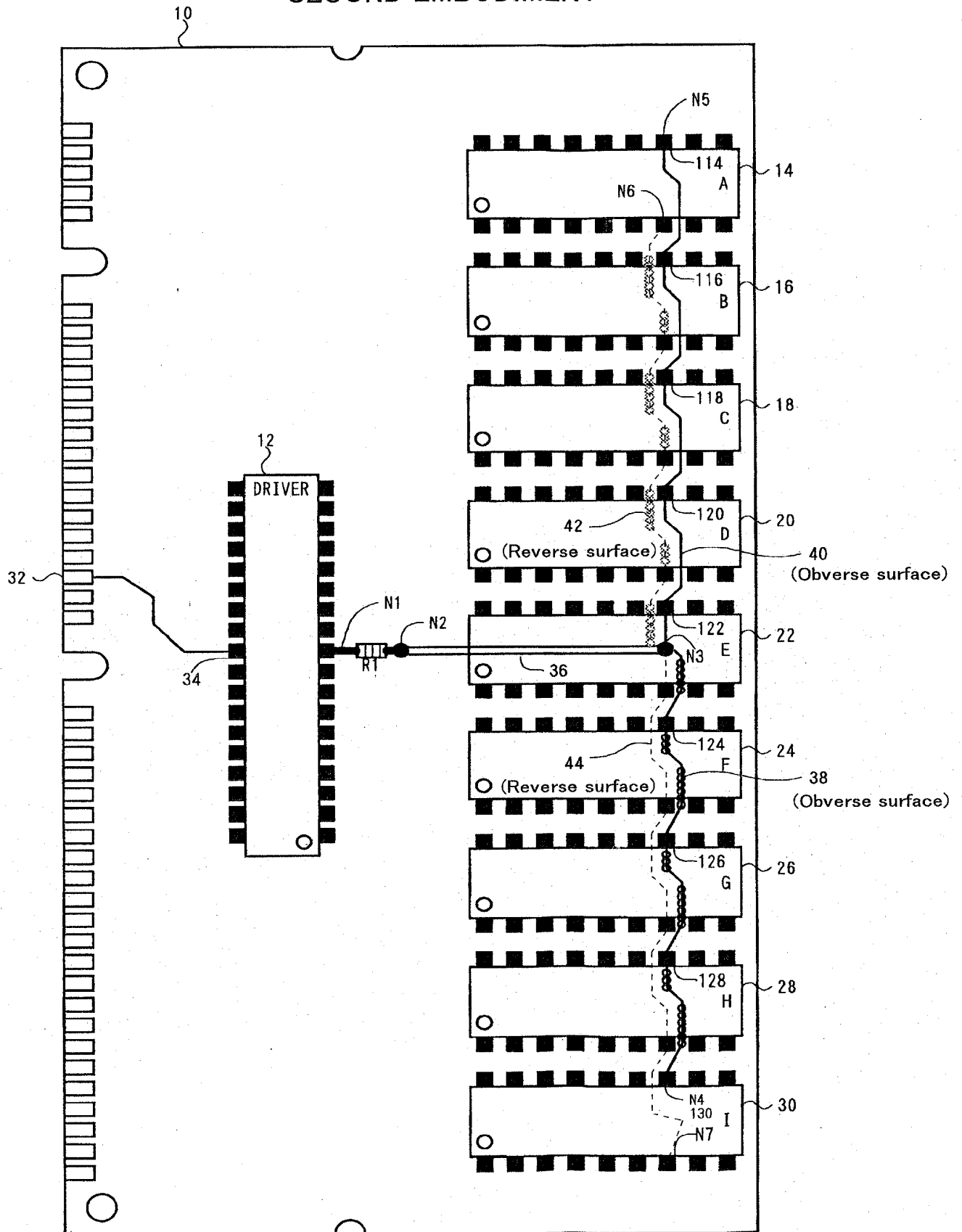
## FIG. 10
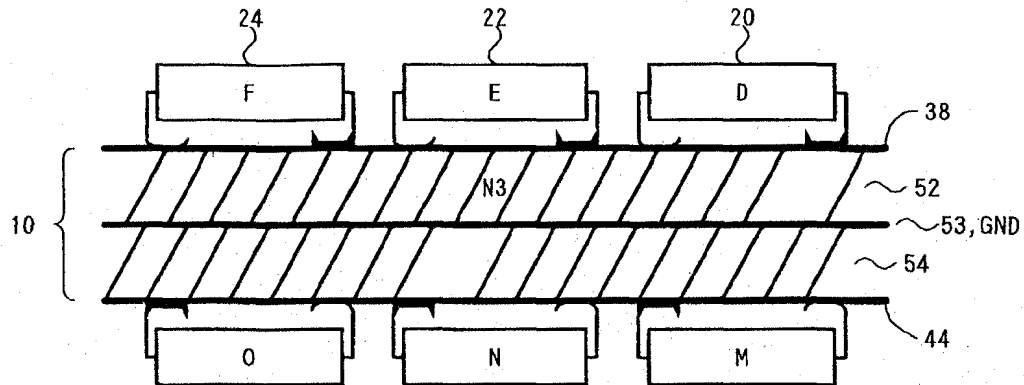
## FIG. 11
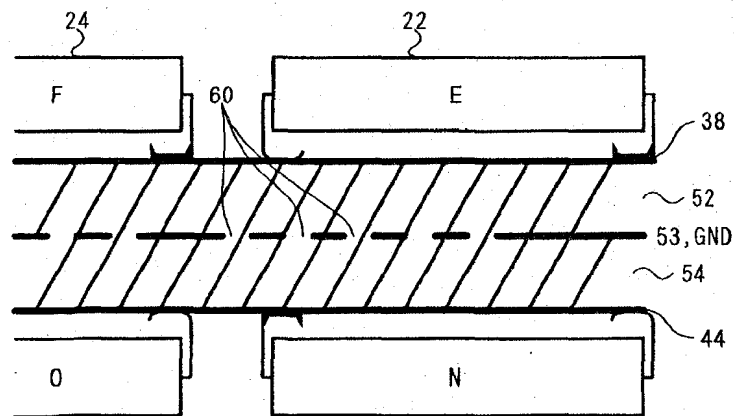
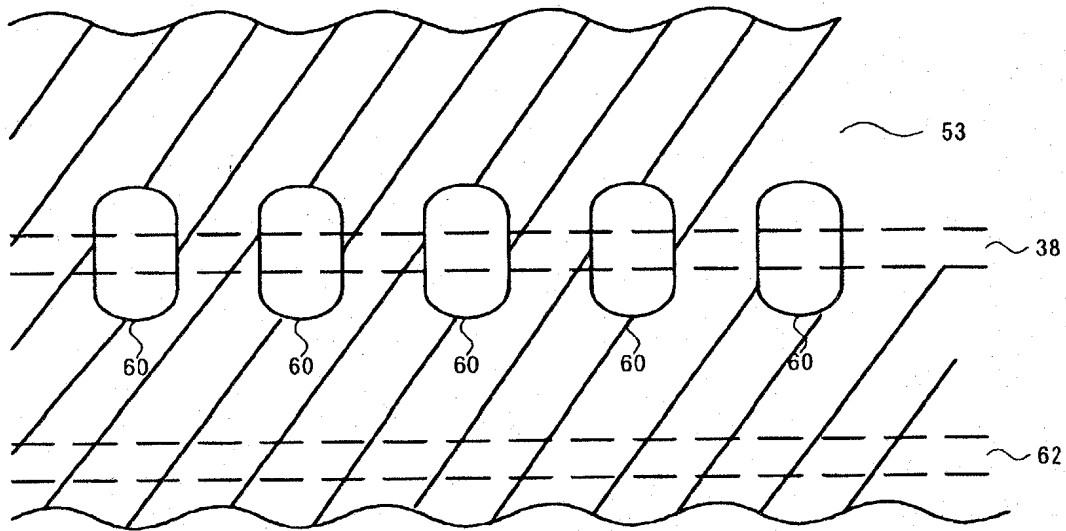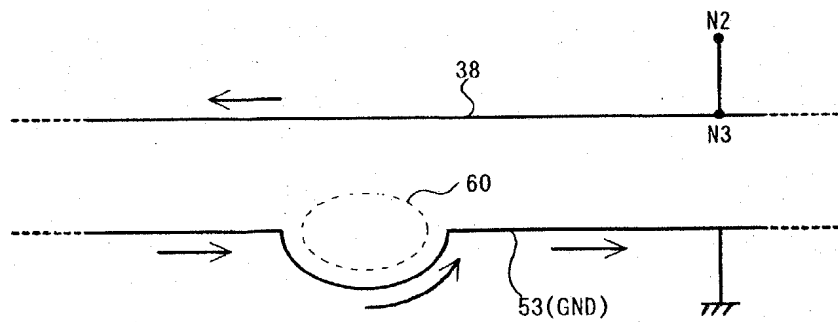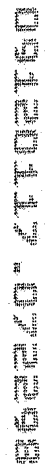# FIG. 12



# FIG. 13

# FIG. 14
## FOURTH EMBODIMENT

# FIG. 15

## EQUIVALENT CIRCUIT FOR SIGNAL LINES